

REMARKS

This application has been reviewed in light of the Office Action dated October 6, 2003. Claims 1-15 are presented for examination, of which Claims 1, 6, and 11 are in independent form. Claims 1, 2, and 4-15 have been amended to define still more clearly what Applicant regards as his invention. Favorable reconsideration is requested.

Claims 1, 2, 4-7, 9-12, 14 and 15 were rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,100,998 (*Nagao et al.*), and Claims 3, 8, and 13 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *Nagao et al.* and U.S. Patent No. 6,559,971 (*Watts et al.*).

As shown above, Applicant has amended independent Claims 1, 6, and 11 in terms that more clearly define what he regards as his invention. Applicant submits that these amended independent claims, together with the remaining claims dependent thereon, are patentably distinct from the cited prior art for at least the following reasons.

The present invention is directed to providing printing control which can optimally schedule expansion processing in plural expansion processing means. In conventional systems, as described in detail in the specification, to overcome the problem of printing overrun, conventional systems employ a technique that causes the transfer wait time to become increasingly longer, thereby decreasing the performance of a printer.

The aspects of the present invention respectively set out in independent Claims 1, 6, and 11 address the foregoing problem by decreasing the number of pre-rendering processes as compared to the conventional technique discussed in the specification.

The aspect of the present invention set forth in Claim 1 is a printing control apparatus. The apparatus includes plural expansion processing means, calculation means,

and scheduling processing means. The plural expansion processing means (i.e., rendering units 67 and 68)¹ expands printing data of a predetermined format to image data of a format to be output to a printer, where the output to the printer is performed on a segment basis. The calculation means calculates, before the expansion processing is performed by the plural expansion processing means, a processing time necessary to expand the printing data to the image data for each segment. The scheduling processing means schedules the expansion processing for each segment by the plural expansion processing means, based on the processing time calculated by the calculation means. Each of the plural expansion processing means has band raster memory areas, independent of the other plural expansion processing means, to hold output images, and the scheduling processing means schedules which segments should each of the plural expansion processing means perform the expansion process on.

Among the important features of Claim 1 are plural expansion processing means which expands printing data of a predetermined format to image data of a format to be output to a printer, and that the scheduling processing means schedules which segments should each of the plural expansion processing means perform the expansion process on. For example, it is possible that rendering unit 67 (one of the plural expansion processing means) sequentially processes bands (segments) B1, B3, B4, and B6, and that rendering unit 68 (one of the other plural expansion processing means) sequentially processes bands B2, B5, and B7, as depicted in Figure 2. By virtue of this structure, the number bands (segments) to which a pre-rendering process should be performed on decreases as

¹/It is to be understood, of course, that the claim scope is not limited by the details of the described embodiments, which are referred to only to facilitate explanation.

compared to the conventional technique described in the specification. As a result, the printing process time is increased.

Nagao et al. relates to a print processor that utilizes a page printer. *Nagao et al.* merely discusses that intermediate data of which the data structure is highly abstract is generated based on input print data. Further an expansion time is estimated based on the number of basic figures constituting the intermediate data and the sizes thereof. The image output speed of an image output means in *Nagao et al.* is determined based on the estimated expansion time.

As is evident from a reading of *Nagao et al.*, the generating processing unit 3 of *Nagao et al.* corresponds to one of the plural expansion processing means of Claim 1, and not the rasterizing process unit 4 of *Nagao et al.* However, the *Nagao et al.* system only has one generating processing unit 3. Accordingly, the generating processing unit 3 has to perform the expansion process alternately to two band buffers A and B (Figure 19). As such, the *Nagao et al.* system is merely an embodiment of the conventional technique described in the present specification.

Further, the Office Action cites column 7, lines 38-40, of *Nagao et al.* as disclosing the rastering processing unit 4 having a plurality of means for processing different types of input data from the intermediate data for each band. Applicant respectfully disagrees. Applicant understands the cited passage as merely discussing that intermediate data are expressed by a set of simple graphics and classified for each of the bands.

Applicant submits that nothing has been found in *Nagao et al.* that would teach or suggest plural expansion processing means which expands printing data of a predetermined format to image data of a format to be output to a printer, and that the

scheduling processing means schedules which segments should each of the plural
expansion processing means perform the expansion process on, as recited in Claim 1.

Accordingly, Applicant submits that Claim 1 is clearly patentable over
Nagao et al.

Independent Claims 6 and 11 are method and storage medium claims,
respectively, corresponding to apparatus Claim 1, and are believed to be patentable for at
least the same reasons as discussed above in connection with Claim 1.

The other claims in this application are each dependent from one or another
of the independent claims discussed above and are therefore believed patentable for the
same reasons. Since each dependent claim is also deemed to define an additional aspect of
the invention, however, the individual reconsideration of the patentability of each on its
own merits is respectfully requested.

In view of the foregoing amendments and remarks, Applicants respectfully
request favorable reconsideration and early passage to issue of the present application.

Applicant's undersigned attorney may be reached in our New York office by
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below listed address.

Respectfully submitted,


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